The Virtual CP:
Training Commanders To Think Outside the Box

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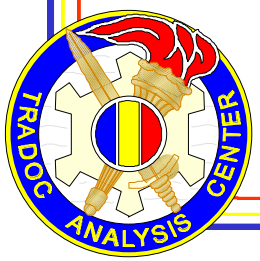
Topics for Discussion

- **An Overview of the AE6 Experiment**
- **Adaptive Thinking/Experimental Hypothesis for AE6**
- **Virtual Environment**
  - General Concept for DLRC
  - Eagle/ModSAF Federate
  - Vision XXI Federate
  - Tactical Federates (SATIDS, MCS, AFATDS)
- **The Software Simulation Interface for Virtual C2**
  - Basic Eagle Design
  - Headquarters/Fighting Units
  - Eagle C2 Architecture
  - Eagle's Tactical Commo
  - Control of Fighting Units
  - Interface with C2 Devices
- **Federation from an HLA View**
  - TAC/TOC Interfaces
  - FOM
  - Summary of Federation Message Load
- **Summary**



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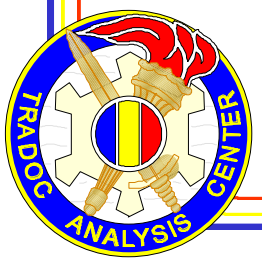
AE6 Objectives

- **Train leaders in a digitized environment and teach adaptive thinking by:**
  - Developing a training methodology that facilitates “how to think” learning
  - Sharing lessons learned from the ATE with the evolving Strike Force concept
  - Supporting the development of training support programs, to include TSPs
- **Enhance training support systems (Staff DLRC, MPRT, Digital AAR, Digital Institutional Staff Trainer (DIST), ...)**
  - Supporting Strike Force initiatives (Strike Force Staff, STAFFEX, LOEs, and other efforts supporting SF Leadership Laboratory efforts) with a digitized training environment
  - Leveraging AE5 residuals
  - Leveraging emerging training systems/simulations in linking live, constructive and virtual domains, and ABCS



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AE6 Hypothesis

- **Hypothesis 1:** If future Army XXI Leaders are taught and deliberately practice the Adaptive Thinking Process developed for the ATE, then their pattern of battlefield thinking will improve (i.e., they will have a better appreciation of the information sets of other BFAs which will improve the breadth and depth of their battlefield performance).
- **Hypothesis 2:** If a Brigade staff is taught and deliberately practices the Adaptive Thinking Process developed for the ATE, then the staff will be more proactive in providing recommendations that consider the multi-disciplinary aspects of the battlefield which will improve the Brigade's efficiency and effectiveness.
- **Hypothesis 3:** If a low-overhead, cost-effective training support environment consisting of Decisive Action and the **Staff Digital Leader Reaction Course (S-DLRC)** are used during the Adaptive Thinking Process, then this will result in leaders attaining a higher level of proficiency in adaptive thinking than using traditional instruction methods (given the same amount of instructional time).

Design of Experiment

- **Two groups selected (from A308)**
- **Group 1- Treatment Group**
- **Group 2- Control Group**
- **Each group consisted of 11 personnel**
- **Group 1 treatment began 9 Mar**
  - Introduction to Adaptive Thinking
  - Cross-BFA Training
  - Decisive Action
  - ABCS Training
- **Capstone Exercise (both Groups)**

The focus of this Briefing

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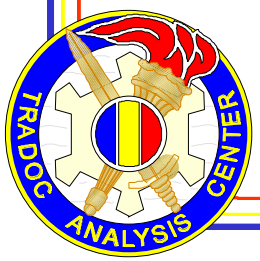
Conduct of Exercise

- 5 days of experimentation
  - Group 1 - AM - 5 hours
  - Group 2 - PM - 5 hours
- A new scenario was exercised each day - generally ran 3 to 4 hours long
  - Monday - Movement to Contact - Scenario 1
  - Tuesday - Movement to Contact - Scenario 2
  - Wednesday - Defense (Check Pointed for each group)
  - Thursday - Continuation of Defense
  - Friday - Attack.
- A total of 4 scenarios were exercised - 10 separate initializations of the federation
- Students roles were key Staff positions in the 1st Brigade TAC & TOC 4th ID.



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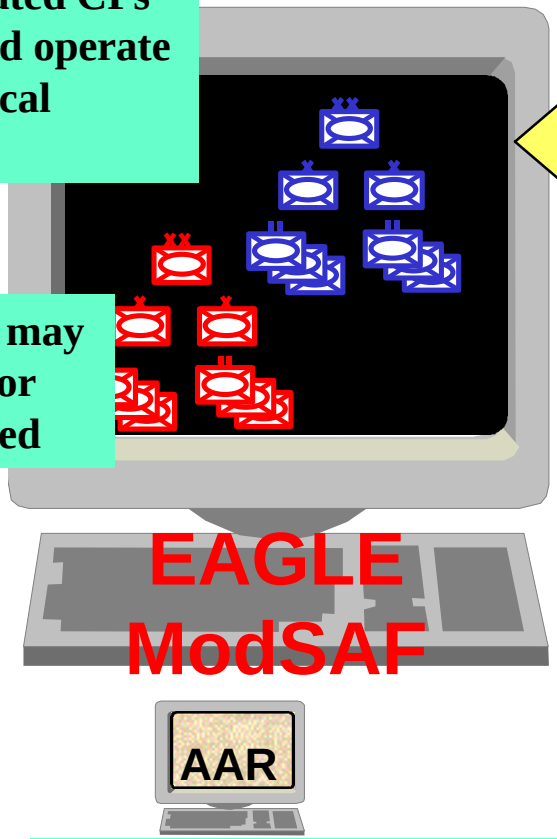
Digital Leader Reaction Course (DLRC)

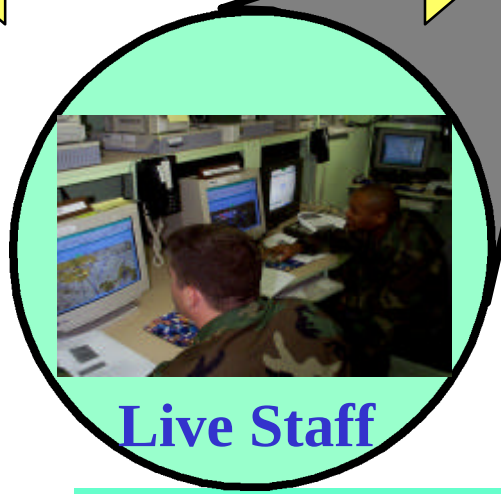
Automated CPs plan and operate on tactical orders

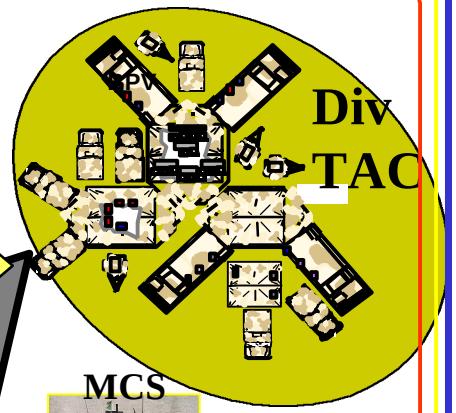
OPFOR may be live or automated

Software interfaces link live staff to automated CPs in Eagle

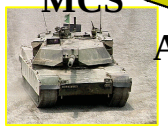
Two Way Software Interface







MCS



AMDWS

ASAS

CSSCS

AFATDS

Automated AAR system collects data from simulation and ABCS devices

The training audience (commander and/or staff) replaces the automated staff in selected command posts

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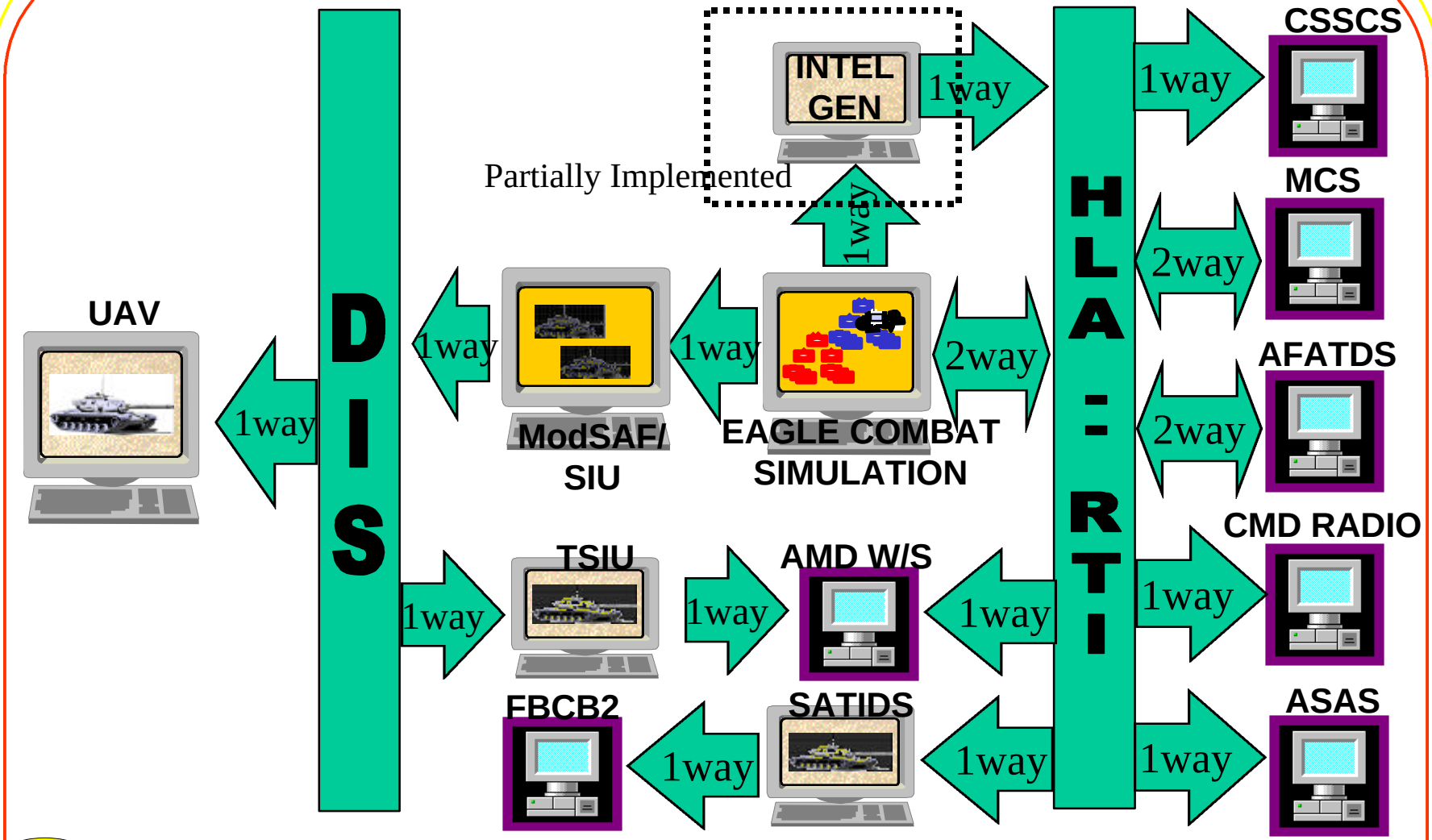
General Architecture



Includes a HLA Federation and DIS Interface.

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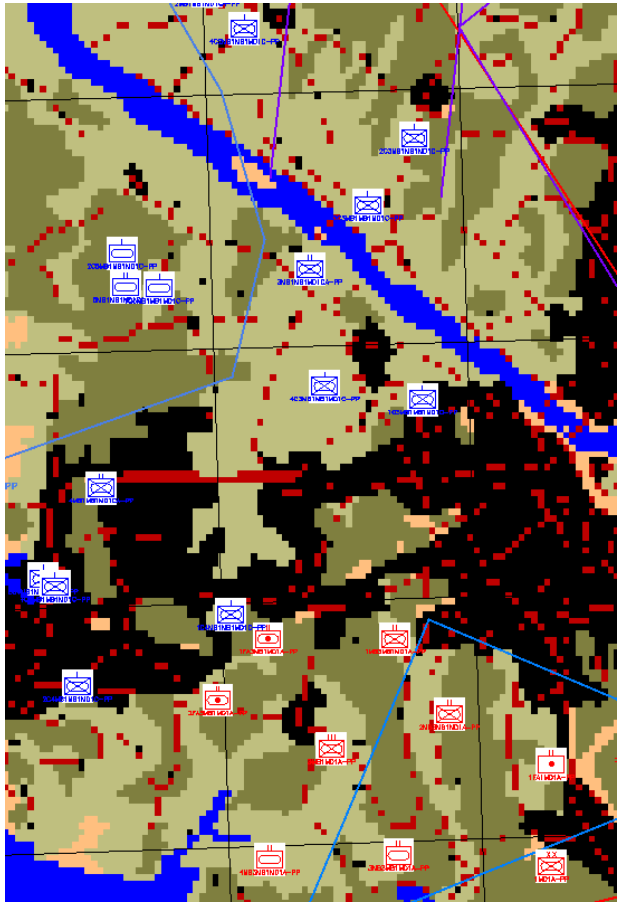
EAGLE/ModSAF

- Eagle is a combat development analysis tool built for study of corps and division level force effectiveness issues.
- Characteristics
  - Corps & below level simulation
  - Resolution to Battalion or Company
  - Integrates Artificial Intelligence methods and conventional combat modeling algorithms (OO & Expert Systems)
  - Command and Control modeled explicitly. OPORDS with Battle Management Language.
- Architectural Flexibility
  - Model runs Standalone or Distributed
  - Constructive model integrated with Virtual Simulation (ModSAF)
  - Interfaces with C4I Hardware (MCS, AFATDS, ASAS, CSSCS, & AMDWS)
  - DIS compatible
  - HLA compliant
- Multiple Resolution
  - ModSAF represents Eagle battle at entity level



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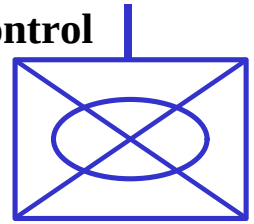
Eagle - Entity Representations for Simulation Interface

Aggregate

Aggregate PDU: Icon display
Eagle Functionality w/ dead reckoning

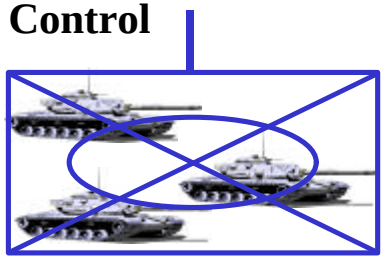
Eagle Control



Pseudo Dissaggregation

Entity PDU: Entity display
Minimum Entity Functionality
Eagle Functionality w/ dead reckoning

Eagle Control



Dissaggregation

Entity PDU: Entity display
Entity Functionality: SAF Directed
Minimum Eagle Functionality

SAF Control

Dissaggregation with Command Force Entity

Entity PDU: Entity display
Entity Functionality: CF Directed
(Synthetic Theater of War- STOW)

CF Control

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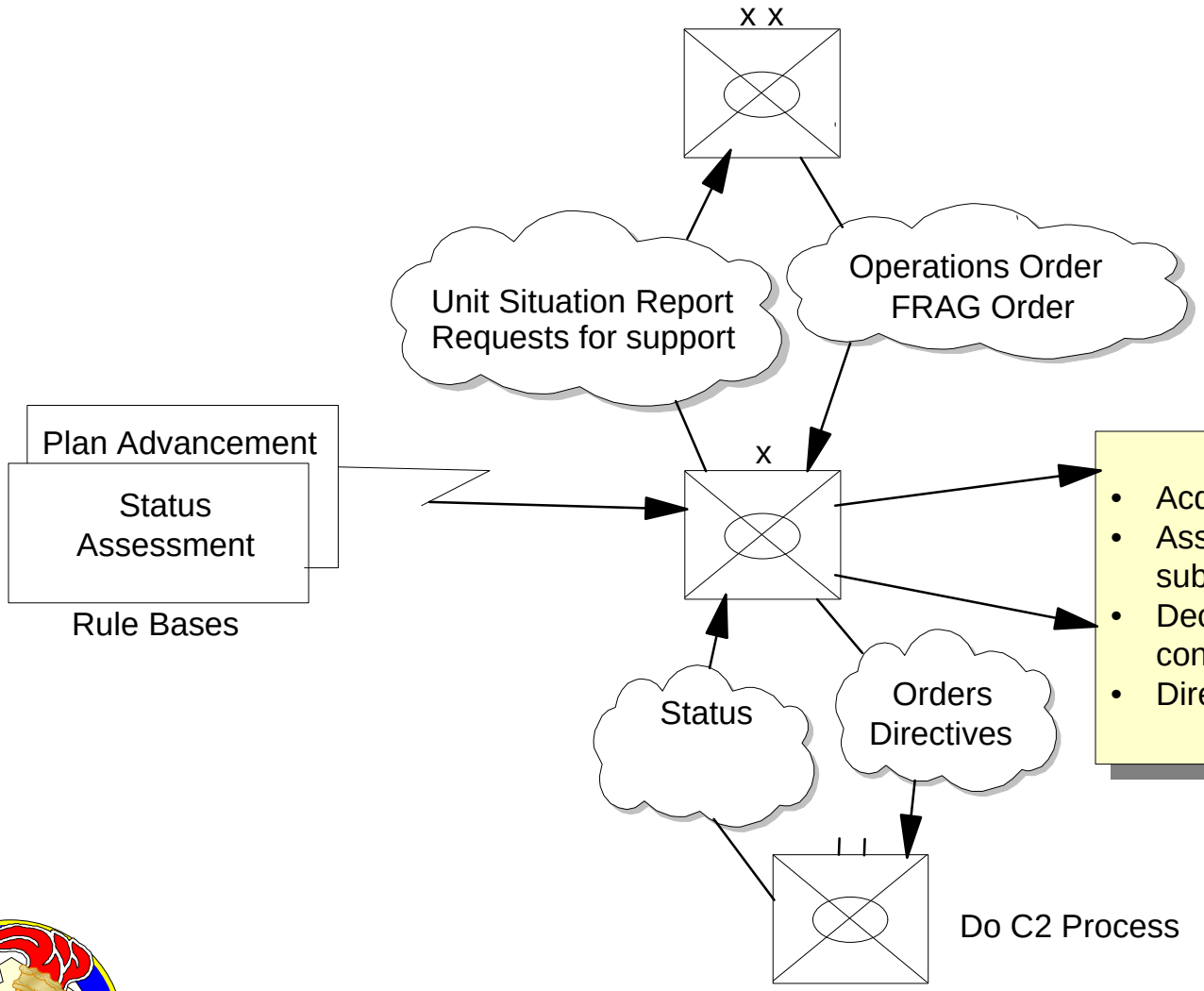
Eagle C2 Architecture

C2 Process Performed at all Echelons Every Time Step



The Eagle C2 Cycle

- Acquire info on friendly/ enemy
- Assess status of self, subordinates, and threat
- Decide COA in Battle Plan context
- Direct lower/respond to higher

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Interface Concept

Divest Cognitive Capability

Command Unit has Physical and Cognitive Capabilities

X
1BDE

Acquire

Assess Decide

Direct

Turned Off

C4I Displays Eagle Status/Respond

Information to C4I equip.

Eagle Message Menu

Eagle Sim Control

Bn's Report Status & receives Orders

Staff Assesses Info. & sends Info. & Directives to Subordinates

Disk

C4I Equip
(Amount of Interaction varies with type of Equip.)

ALL information provided to Staff & ALL directives are saved for Analysis.

Normal Commo

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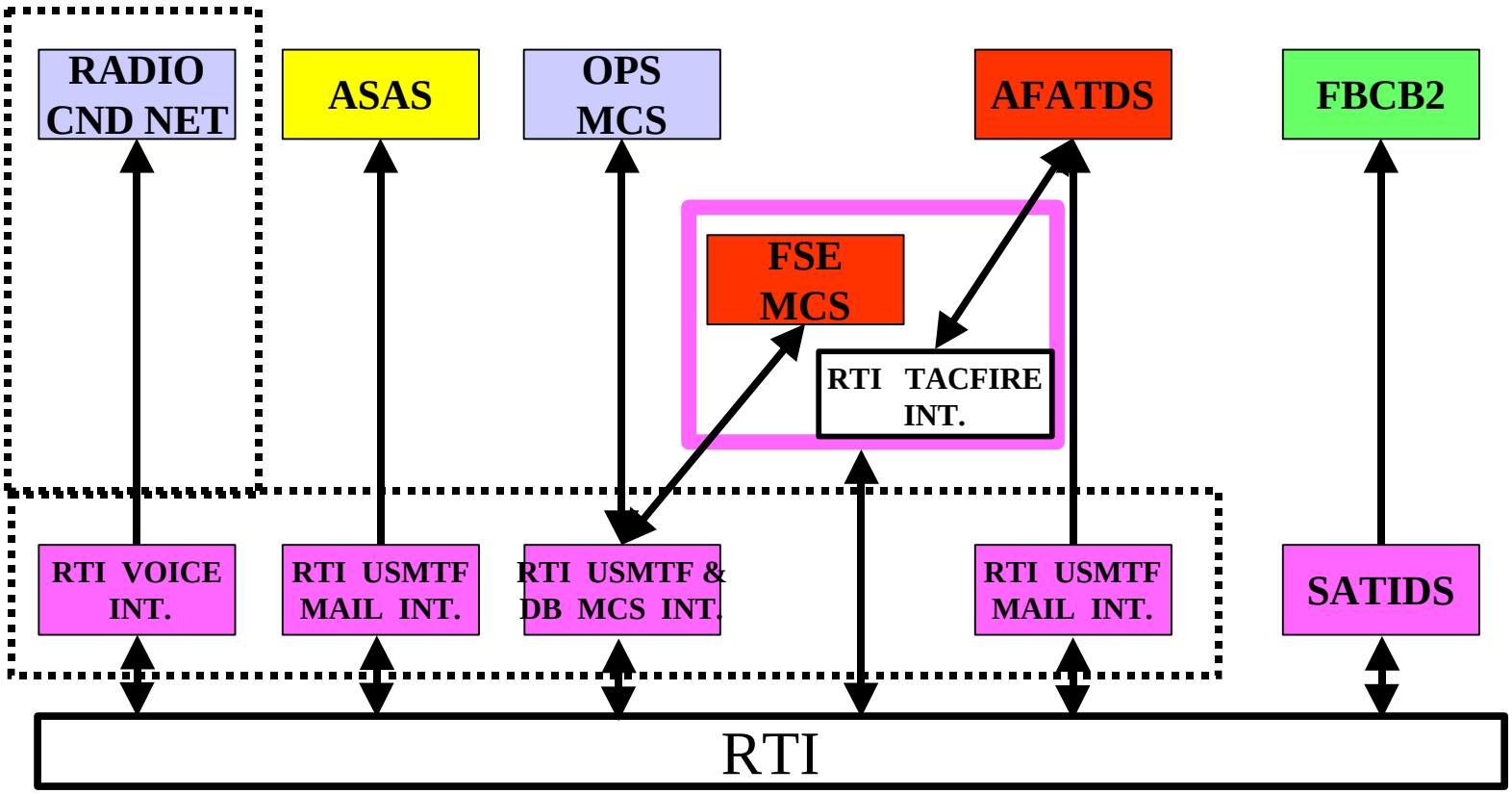
BDE TAC RTI Interfaces



5 BFA Devices on 5 Computers

1 Simulated Radio on 1 Computer (shared on Interface Computer)

2 Interface Computers .....

6 RTI Federates (4 on 1 computer, 1 on BFA & 1 on 1 computer)

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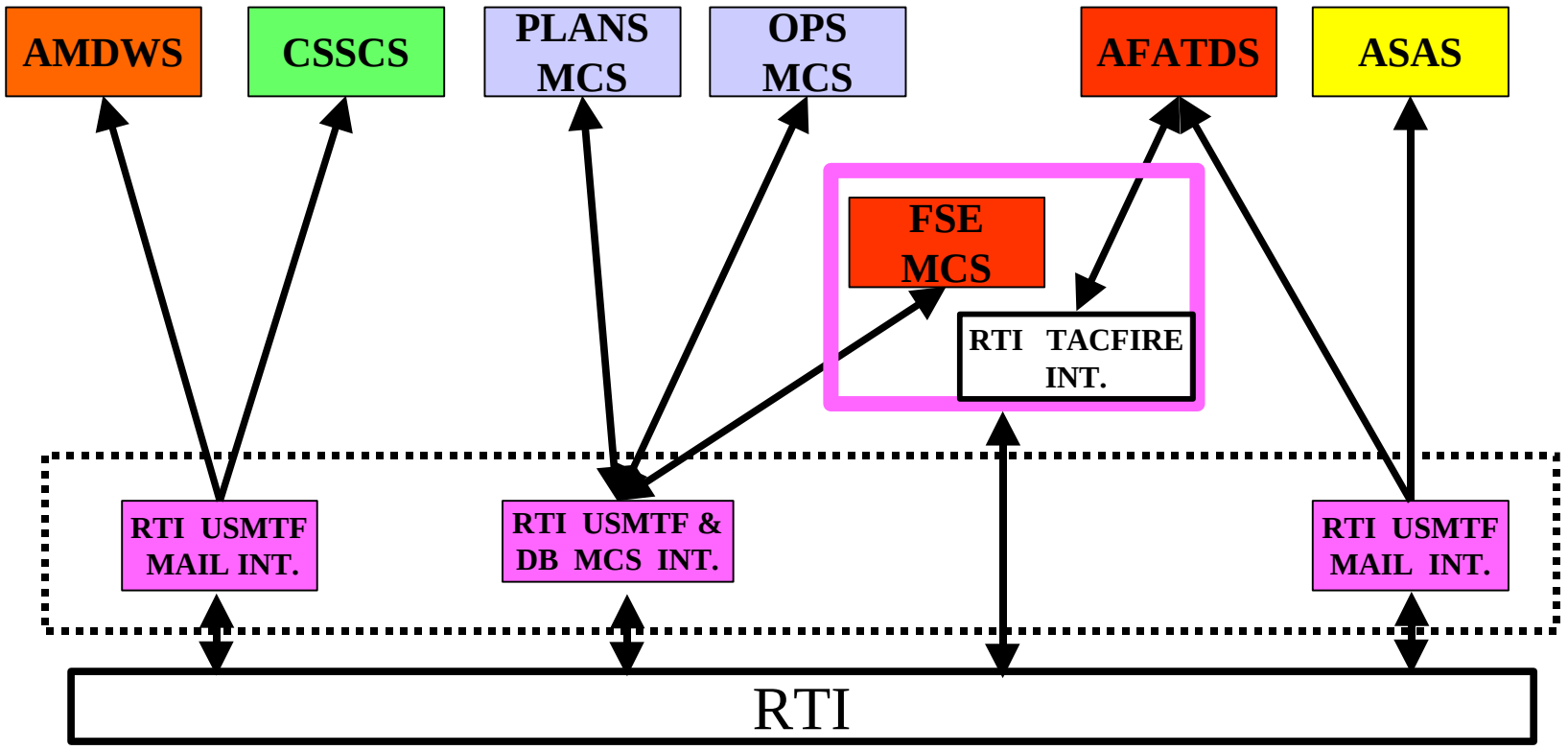
BDE TOC RTI Interfaces



7 BFA Devices on 7 Computers

1 Interface Computer .....

4 RTI Federates (3 on 1 computer, 1 on BFA)

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Federation Object Model

	EAGLE	SATIDS	MCS	MSG	AFATDS	RADIO
INTERACTIONS						
FCB2_Enemy	P	S				
Voice	P					S
New Unit	P		S			
Friendly Sit. Updates	P		S			
Enemy Sit. Updates	P		S			
Graphic	P		S			
Email Messages	P		S	S		
Mcs Messages	S		P			
Tacfire Update	P				S	
Tacfire Ammo	P				S	
Tacfire MFR	P				S	
Tacfire CDR	P				S	
Tacfire CFF	S				P	
Distributed Eagle -20	P					

13 Interaction Classes defined (33 with Distributed Eagle)

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Summary - Federation

- Typical Exercise - Defense - Day 2 - 3 hrs 15 min combat
- Total Object Updates - 10,847 (includes Distributed Eagle)
- Total Interactions OUT
  - To Staff Interface Equipment: 16,815
  - Total including Distributed Eagle: 18,312
- Total Interactions from the Staff to Eagle: 258
- Total Interactions sent to each Cell by BFA:

Does not include staff initiated email

BDE TAC	(5758)
ASAS	317
OPS MCS	2040
FSE MCS	1965
AFATDS	747
SATIDS	127
RADIO	562

DIV TOC	(3848)
ASAS	370
CSSCS	148
OPS MCS	1688
FSE MCS	1140
AFATDS	502

OPFOR	(1661)
OPS MCS	1197
RADIO	464

BDE TOC	(5548)
ASAS	317
CSSCS	249
AMDWS	151
OPS MCS	2153
FSE MCS	1944
AFATDS	731

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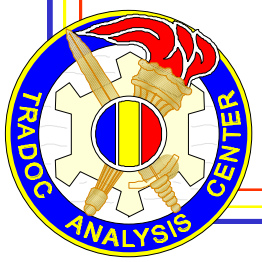
Summary

- **Students**
  - **Initial Feedback - Very Positive.**
  - **Need SOP for Brigade in Simulation - reports, etc.**
    - **Definitions - Battle, Combat Intensity, etc.**
  - **Desire additional functionality for Engineer & Logistics**
    - **How to provide two way interface**
  - **Time - Simulation Time, Wall Clock Time, Machine Time.**
- **Federation Management / Coordination**
  - **Getting Federation up and running**
  - **Additional Complexity of BFA Software operational.**



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